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Deformation of a membrane in a pulsatile flow: implications in heart valve design C. HERNANDEZ, J.E.V. GUZMAN, R. ZENIT, Universidad Nacional Autonoma de Mexico — Current designs of heart valves prosthetics have serious disadvantages and health issues for patients who use them. For this reason, a new design that combines durability (mechanical valves) and biocompatibility (biological valves) has to be conceived. Natural valves have very complex geometry because their leaflets have two principal curvatures, one imposed by the holding ring and a second one imposed by the bending of the closing arrangement. The objective of this research is to study the effects of both curvatures on the performance of a leaflet. It is well known that the increase of the curvature results in a larger stiffness, which, in turn, reduces the deflection of a leaflet. We conducted a study to determine the effect of changing the curvature (in two directions) of a flexible membrane when exposed to a steady and pulsatile flows. A study of the flow field that results from this interaction is also conducted by PIV measurements. Preliminary results of the leaflet deflection for many stiffnesses, curvatures and flow conditions will be presented and discussed.

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